

What is claimed is:

1. A camera apparatus comprising:

(a) a tilt unit in which a camera is installed at the front of a first rotation axis, said tilt unit tilting about said first rotation axis;

(b) a pan unit in which said tilt unit is rotatably held and tilt unit driving means for rotating said tilt unit is provided at the back of said first rotation axis, said pan unit panning about a second rotation axis perpendicular to said first rotation axis; and

(c) a casing for rotatably holding said pan unit, said casing being provided with pan driving means for rotating said pan unit.

2. A camera apparatus comprising:

(a) a casing having an opening on at least one face;

(b) a pan unit disposed on said casing, said pan unit having an external video incident section;

(c) a pan shaft disposed on said pan unit;

(d) a pan shaft support disposed near said opening for rotatably supporting said pan shaft;

(e) pan driving means for rotating said pan unit about said pan shaft;

(f) a tilt unit having an internal video incident section and a tilt face inside said pan unit, said tilt face being concealed from said external video incident section, and said tilt unit being disposed in a way so as to visibly couple said external video incident section and said internal video incident section;

(g) a tilt shaft disposed on said pan unit;

(h) a camera disposed inside said tilt unit; and

(i) tilt driving means for rotating said tilt unit about said tilt shaft, said tilt driving means being disposed inside said pan unit at the back of said tilt shaft.

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3. The camera apparatus as defined in Claim 2, wherein:

said opening is round;

said pan unit is spherical hollow; and

10 said pan unit is disposed inside said casing such that a part of said pan unit protrudes outward from said opening in said casing.

15 4. The camera apparatus as defined in Claim 2, wherein said pan shaft is integrally formed on an outer wall of said pan unit at least at one of an upper and lower areas; and said pan shaft support is fixedly disposed near said opening at least at one of an upper and lower areas.

5. The camera apparatus as defined in Claim 2, wherein said tilt shaft is integrally formed on an inner wall of said pan unit.

20 6. The camera apparatus as defined in Claim 2, wherein said tilt face is practically a part of a spherical face.

7. The camera apparatus as defined in Claim 3, wherein said pan shaft is coaxial to a spherical center axis of said pan unit.

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8. The camera apparatus as defined in Claim 3, wherein said tilt shaft is perpendicular to said pan shaft, and is coaxial to a spherical center axis of said pan unit.

5 9. The camera apparatus as defined in Claim 3, wherein said tilt driving means comprising:
a tilt motor integrally coupled to one of inside and a part of said pan unit;

10 a tilt worm gear rotating in synchronization with the rotation of a driving shaft of said tilt motor; and
a tilt worm wheel rotating about said tilt shaft in synchronization with the rotation of said tilt worm gear.

15 10. The camera apparatus as defined in Claim 9, wherein said tilt motor and said camera are respectively disposed at the front and back of said pan shaft inside said pan unit.

11. The camera apparatus as defined in Claim 9, wherein said tilt worm wheel is disposed between said tilt motor and said camera inside said pan unit.

20 12. The camera apparatus as defined in Claim 9, wherein said tilt worm wheel is disposed at a position higher than said tilt shaft inside said pan unit.

25 13. The camera apparatus as defined in Claim 9 having at least one hooking hole on a rear face of said casing.

14. The camera apparatus as defined in Claim 2, wherein said tilt unit is rotatable to a predetermined position where said internal video incident section of said camera is not visibly coupled to said external video incident section of said pan unit.

15. The camera apparatus as defined in Claim 14 further comprising a controller for rotating said tilt unit to said predetermined position when said camera apparatus is not in a video-shooting mode.

16. The camera apparatus as defined in Claim 14 further comprising a controller having a network interface connectable to a network, and said controller controlling the rotation of said tilt unit in accordance with information received from said network.

17. A camera apparatus comprising:

(a) a tilt unit in which a camera is installed at its front and a tilt worm wheel is installed at its back, said tilt unit being rotatably held for vertically rotating about a tilt shaft;

(b) a pan unit having a pan worm wheel at its bottom end, said pan unit being rotatably held by a pan shaft disposed at its top and bottom ends for horizontal rotation, and said pan unit holding said tilt shaft;

(c) a casing for rotatably holding said pan unit for rotating about said pan shaft;

(d) tilt driving means disposed inside said pan unit, said tilt driving means having a tilt worm gear for rotating said tilt unit by engaging said tilt worm wheel; and

5 (e) pan driving means disposed inside said casing, said pan driving means having a pan worm gear for rotating said pan unit by engaging said pan worm wheel;

wherein said tilt worm wheel and said tilt worm gear engage at a position higher than said tilt shaft; and

10 said pan worm wheel and said pan worm gear engage at a position lower than said tilt shaft.

18. A camera apparatus comprising:

15 (a) a tilt unit in which a camera having an internal video incident section is installed at the front of a first rotation axis, said tilt unit tilting about said first rotation axis; and

(b) a pan unit which rotatably holds said tilt unit, said pan unit having an external video incident section to which said internal video incident section is visibly coupled, and said pan unit panning about a second rotation axis perpendicular to said first rotation axis;

20 wherein said tilt unit is also rotatable to a predetermined position where said internal video incident section and said external video incident section are visibly uncoupled.

19. A camera apparatus comprising:

25 (a) a pan unit having an external video incident section; and

(b) a tilt unit disposed inside said pan unit, said tilt unit having an internal video incident section and a camera, and said tilt unit being rotatable by the rotation of a tilt motor to a first position where said external video incident section and said internal video incident section are visibly coupled;

5 wherein said tilt unit is also rotatable to a second position where said internal video incident section and said external video incident section are visibly uncoupled.

20. A camera holder comprising:

(a) a base formed into a board; and

10 (b) a camera anchoring section for hooking and securing a camera apparatus on its front, said camera apparatus having a hooking hole, and said camera anchoring section being disposed practically perpendicular to said base;

15 wherein at least one hook is disposed on a front face of said camera anchoring section at vertically symmetric positions, and said hook is disposed corresponding to said hooking hole on said camera apparatus.

21. The camera holder as defined in Claim 20, wherein the front face of said camera anchoring section is tilted for not less than 5 degrees and not greater than 20 degrees from the perpendicular relative to said base.

22. The camera support as defined in Claim 21, wherein said tilting is practically 10 degrees.